

# USER'S INFORMATION MANUAL



## HOT WATER HEATING BOILERS DOMESTIC WATER HEATERS 150,000 - 300,000 Btu/hr MODELS



### IMPORTANT

**INSTALLER - AFFIX INSTALLATION MANUAL ADJACENT TO THE BOILER**

**CONSUMER - RETAIN THE USER'S INFORMATION MANUAL FOR FUTURE REFERENCE**

**DO NOT** Use this appliance if any part has been **under water**. The possible damage to a flooded appliance can be extensive and present numerous safety hazards. Any appliance that has been **under water** must be replaced.

### LIGHTING INSTRUCTIONS FOR YOUR SAFETY, READ BEFORE OPERATING

### ⚠ WARNING

If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

This appliance **MUST NOT** be installed in any location where gasoline or flammable vapors are likely to be present.

### WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbors phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

### ⚠ WARNING

**If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.**

1. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
2. **BEFORE OPERATING**, smell around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle to the floor.
3. Use only your hand to turn the gas control lever. Never use tools. If the lever will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
4. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

### USER WARNING

The information contained in this manual is intended for use by qualified professional installers, service technicians or gas suppliers. Consult your local expert for proper installation or service procedures.

### ⚠ WARNING

Should overheating occur or the gas supply fail to shut off, do not turn off or disconnect the electrical supply to the pump. Instead, shut off the gas supply at a location external to the appliance.

## LIGHTING INSTRUCTIONS

1. **STOP!** Read the safety information above.
2. Turn off all electrical power to the appliance.
3. Remove the upper front access panel
4. Turn the power switch on the inside of the cabinet to "OFF" position.
5. Set the thermostat to the lowest setting.
6. This appliance is equipped with an ignition device which automatically lights the burners. **DO NOT** try to light the burners by hand.
7. Turn the gas control knob on the gas valve clockwise to the "OFF" position.

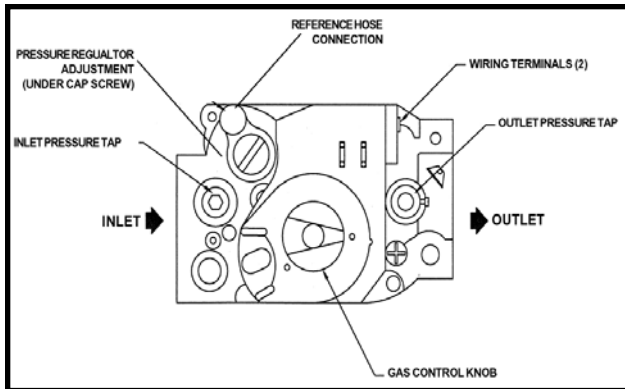


FIG. 1 Combination Gas Valve

8. Wait five (5) minutes to clear out any gas. If you smell gas, **STOP!** Follow the instructions in the safety information "What To Do If You Smell Gas". If you don't smell gas, go on to the next step.
9. Turn the gas control knob on the gas valve counterclockwise to the "ON" position.
10. Set the thermostat to the desired setting.
11. Turn the power switch on the inside of the cabinet to the "ON" position.
12. Replace control access panel.
13. Turn on all electrical power to the appliance.
14. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

## TO TURN OFF GAS TO APPLIANCE

1. Turn off all electric power to the appliance if service is to be performed.
2. Turn the gas control knob on the gas valve clockwise to the "OFF" position. Do not force.

### ⚠ WARNING

**Should overheating occur or the gas fail to shut off, do not turn off or disconnect the electric supply to the pump. Instead, shut off the gas supply at a location external to the appliance.**

## HOT SURFACE IGNITION SYSTEM

The hot surface ignition module is not repairable. Any modification or repairs will invalidate the warranty and may create hazardous conditions that result in property damage, personal injury, fire, explosion and/or toxic gases. A faulty ignition module must be replaced with a new unit. The hot surface igniter is also the flame sensor.

Call a qualified service technician if service is required on the hot surface ignition system.

## WATER CONNECTIONS

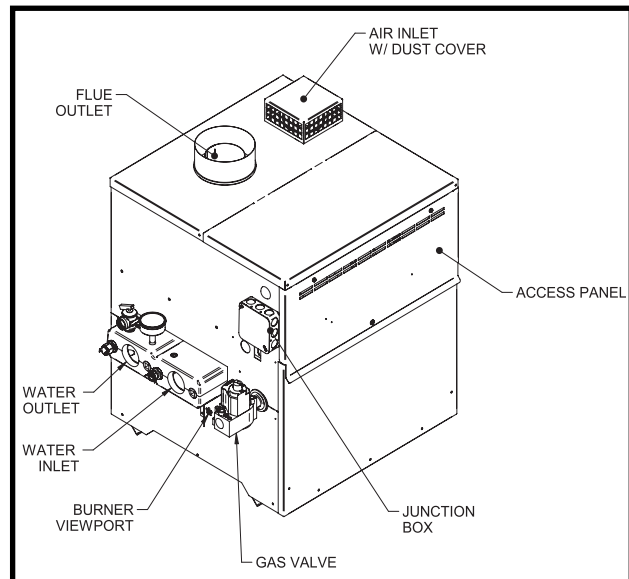


FIG. 2 Water Connections

### Inlet and Outlet Connections

For ease of service, install unions on inlet and outlet of the appliance. The connection to the appliance marked "Inlet" on the header should be used for return from the system. The connection on the header marked "Outlet" is to be connected to the supply side of the system.

## RELIEF VALVE

This appliance is supplied with a relief valve(s) sized in accordance with ASME Boiler and Pressure Vessel Code, Section IV ("Heating Boilers"). The relief valve(s) is installed in the vertical position and mounted in the hot water outlet. No valve is to be placed between the relief valve, and the appliance. To prevent water damage, the discharge from the relief valve shall be piped to a suitable floor drain for disposal when relief occurs. No reducing couplings or other restrictions shall be installed in the discharge line. The discharge line shall allow complete drainage of the valve and line. Relief valves should be manually operated at least once a year.

## ⚠ CAUTION

Avoid contact with hot discharge water.

## VENT SYSTEM OPTIONS

This appliance has five venting options. They are:

- 1. Conventional Negative Draft Venting**  
Conventional negative draft venting with vertical termination.
- 2. E+ with a Vertical Conventional Vent**  
E+Vent with a vertical conventional vent for flue products and a combustion air pipe from either the sidewall or roof top.
- 3. Direct Venting with Sidewall Terminations**  
Direct vent with sidewall terminations for flue products and combustion air.
- 4. Direct Venting with Vertical Terminations**  
Direct vent with vertical through-roof terminations for flue products and combustion air.
- 5. Outdoor Installation**  
Outdoor installation consists of the installation of a special vent cap / top assembly, gas valve cover, deflectors, and a weatherproof junction box.

All appliances are shipped from the factory equipped for conventional negative draft venting. All other optional vent systems require the installation of specific vent kits and venting materials. See the *Installation and Service Manual* for a detailed explanation of the installation requirements for each venting system, components used and part numbers of vent kits for each model.

## ⚠ WARNING

Using other vent or air intake materials, failure to properly seal all seams and joints or failure to follow vent pipe manufacturer's instructions can result in personal injury, death or property damage. Mixing of venting materials will void the warranty and certification of the appliance.

## IMPORTANT:

Examine the venting system at least once a year. Check all joints and vent pipe connections for tightness. Also check for corrosion or deterioration. Immediately correct any problems observed in the venting system.

## COMBUSTION AND VENTILATION AIR REQUIREMENTS FOR CONVENTIONALLY VENTED APPLIANCES

Provisions for combustion and ventilation air must be in accordance with Section 5.3, Air for Combustion and Ventilation, of the latest edition of the National Fuel Gas Code, ANSI Z223.1, in Canada, the latest edition of CGA Standard B149 Installation Code for Gas Burning Appliances and Equipment, or applicable provisions of the local building codes.

## ⚠ CAUTION

Under no circumstances should the equipment room ever be under a negative pressure. Particular care should be taken where exhaust fans, attic fans, clothes dryers, compressors, air handling units, etc., may take away air from the unit.

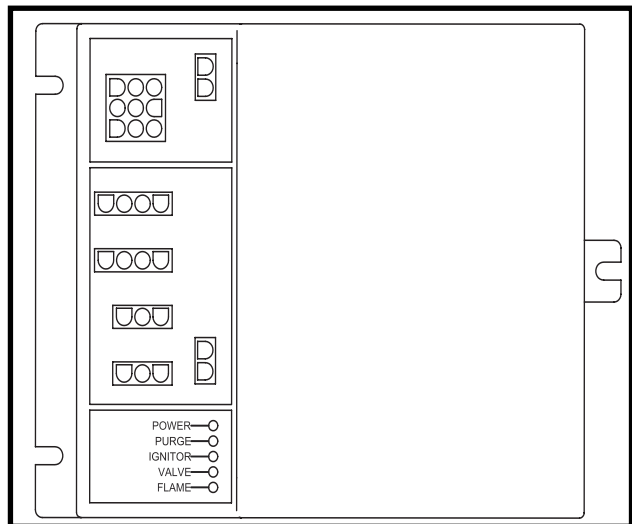
### *E+ Vent and Direct Vent Units*

These optional venting systems use two pipes, one pipe to exhaust flue products and one pipe to supply combustion air directly to the appliance. The optional vent systems have specific material and installation requirements. The combustion air pipe for the optional vent systems may terminate horizontally with a sidewall air inlet or vertically with a rooftop air inlet, based on the venting system installed. A detailed explanation of the installation requirements for each venting system, components used and part numbers of vent kits for each model is included in the *Installation and Service Manual*. No additional combustion air openings are required for the mechanical room when the optional two pipe venting systems are properly installed.

The combustion air supply must be completely free of any chemical fumes which may be corrosive to the appliance. Common chemical fumes which must be avoided are fluorocarbons and other halogenated compounds, most commonly present as refrigerants or solvents, such as Freon, trichlorethylene, perchlorethylene, chlorine, etc. These chemicals, when burned form acids which quickly attack the heat exchanger finned tubes, tube headers, flue collectors, and the vent system. The result is improper combustion and a non-warrantable, premature appliance failure.

**EXHAUST FANS:** Any fan or equipment which exhausts air from the mechanical room may deplete the combustion air supply and/or cause a down draft in the venting system. Spillage of flue products from the venting system into an occupied living space can cause a very hazardous condition that must be immediately corrected. If a fan is used to supply combustion air to the boiler room, the installer must make sure that it does not cause drafts which could lead to nuisance operational problems with the appliance.

### OPERATION AND DIAGNOSTIC LIGHTS



**FIG. 3 Ignition Module**

The unit has a lighted ON/OFF power switch on the outer cabinet (left side) and five (5) LED indicators on the electronic ignition control module to monitor the units operation.

### TABLE - A IGNITION MODULE INDICATING LIGHTS

Indicating Light	Function
Power on Switch	- On - 120 VAC supplied to unit
Power LED	- On - Module is powered from 24 VAC system and operating properly - Blinks continuously if voltage is too high on transformer secondary - Off - Module is not powered
Purge LED	- Off - Combustion air fan is not powered OR air flow is not proven - On - When unit is in prepurge or interpurge - Blinks continuously when there is a pressure switch fault
Ignitor LED	- Off - Igniter is off - On - When hot surface igniter is on
Valve LED	- Off - Gas valve is closed - On - Control signaling gas valve is on - Blinks continuously when control is in LOCKOUT because it failed ignition
Flame LED	- Off - Flame is not present - On - Control signaling flame is present - Blinks continuously when L1 and neutral are reversed

### MAINTENANCE

Listed below are items that must be checked to ensure safe reliable operations. Verify proper operation after servicing.

### ⚠ CAUTION

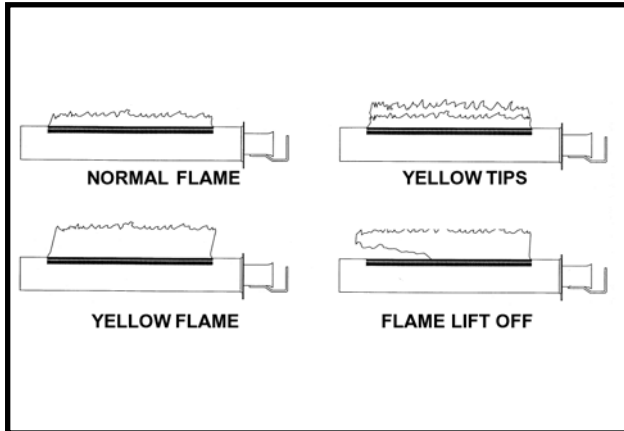
**Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.**

1. Examine the venting system at least once a year. Check more often in first year to determine inspection interval. Check all joints and pipe connections for tightness, corrosion or deterioration. Clean screens in the venting air intake system as required. Have the entire system, including the venting system, periodically inspected by a qualified service agency.

2. Using the view port, located below the water connections, visually check main burner flames at each start up after long shutdown periods or at least every six months.

### ⚠ WARNING

**This area is hot and direct contact could result in burns.**



**FIG. 4 Burner Flame Patterns**

- a. **Normal Flame**: A normal flame is blue, with slight yellow tips, with a well defined inner cone and no flame lifting.
- b. **Yellow Tip**: Yellow tip can be caused by blockage or partial obstruction of air flow to the burner(s).
- c. **Yellow Flames**: Yellow flames can be caused by blockage of primary air flow to the burner(s) or excessive gas input. This condition **MUST** be corrected immediately.
- d. **Lifting Flames**: Lifting flames can be caused by over firing the burner(s) or excessive primary air.

If improper flame is observed, examine the venting system, ensure proper gas supply and adjust the combustion air.

3. **Combustion Air Shutter Adjustment**: This appliance uses a fan assisted combustion process. The fan air shutter is factory pre-set and should not need adjustment in most cases. If adjustment is required, the fan air shutter may be manually adjusted to a dimension specified for each model.

4. **Flue Gas Passageways Cleaning Procedures**: Any sign of soot at the burners indicate a need for cleaning. The following cleaning procedure must only be performed by a qualified serviceman or installer. Proper service is required to maintain safe operation. Properly installed and adjusted units seldom need flue cleaning.

All gaskets on disassembled components must be replaced with new gaskets on reassembly. Gasket kits are available from your distributor.

- a. Turn off main power to appliance.
- b. Turn off main manual gas shutoff to appliance.
- c. Remove the front outer jacket panels.
- d. Remove gas valve from the manifold.
- e. Remove screws from manifold mounting brackets. Pull manifold(s) / orifice assembly away from burners. Remove hose from burner tap.
- f. Remove mounting screws from each burner and slide burner out toward front of appliance. Use caution to prevent damage to burner gaskets, refractory, hot surface igniter or wiring.
- g. Remove soot from burners with a stiff bristle brush. Damaged burners or burner gaskets must be replaced.

### HEAT EXCHANGER CLEANING

5. Check the heat exchanger surface for sooting. If present, heat exchanger must be cleaned and problem corrected. Proceed as follows.
  - a. Remove manifold/orifice assembly as described in steps "a" through "e" in "Burner Removal" in the Installation and Service Manual.
  - b. Disconnect wiring from hot surface igniter and hose from burner tap.
  - c. Remove inner combustion chamber door mounting screws, tilt slightly and slide door assembly out toward front of appliance. Use caution to prevent damage to refractory, hot surface igniter, hose and wiring.
  - d. Check "V" baffles on top of heat exchanger. Remove and clean if necessary.
  - e. Remove soot from heat exchanger with a stiff bristle brush. Use a vacuum to remove loose soot from surfaces and inner chamber.

- f. Carefully reinstall combustion chamber door, jacket panels, dividers, burners, manifolds wires and hoses. Use new gasket material for proper air seal.
- g. Reassemble and test for gas leaks.
- h. Cycle appliance and check for proper operation.

An appliance installed in a dust or dirt contaminated atmosphere will require cleaning of the burners on a 3 to 6 month schedule or more often, based on severity of contamination. Contaminants can be drawn in with the combustion air. Non-combustible particulate matter such as dust, dirt, concrete dust or dry wall dust can block burner ports and cause non-warrantable failure. Use extreme care when operating an appliance for temporary heat during new construction. The burners and fan will probably require a thorough cleaning before the appliance is placed in service.

- 6. **Combustion Air Fan:** The combustion air fan should be checked every 6 months. Clean as required when installed in a dust or dirt contaminated location.
- 7. **Water Circulating Pump:** Inspect pump every 6 months and oil as necessary. Use SAE 30 non-detergent oil or lubricant specified by pump manufacturer.
- 8. Keep appliance area clear and free from combustible materials, gasoline and other flammable vapors and liquids.
- 9. Check frequently to be sure the flow of combustion and ventilation air to the boiler is not obstructed.

## TEMPERATURE ADJUSTMENT

### Operating Temperature Control

#### NOTE:

The temperature controller is pre-set at the factory with test settings. You may need to adjust the settings to meet your specific needs.

#### ⚠ WARNING

Return water temperatures must not be less than 140°F. If lower return water temperatures are required, follow the instructions in the *Low Temperature Bypass Requirements or Three-Way Valves* section(s) in the Installation and Service Manual.

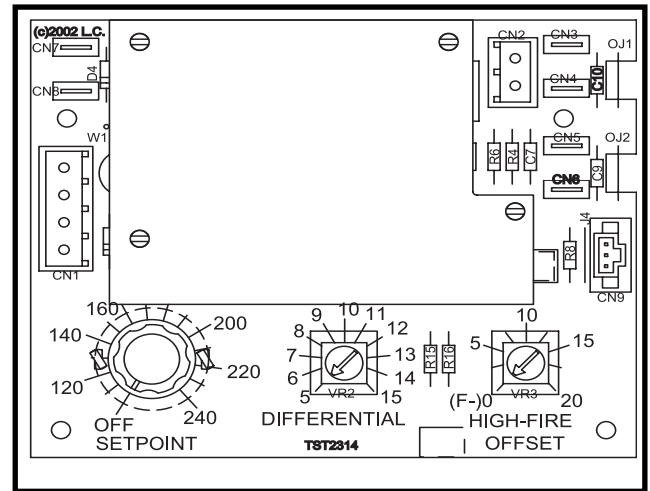
### Locating Temperature Control

Remove the control panel door on the front of the appliance in order to locate and access the temperature control.

### Temperature Control Settings

There are three setting knobs on the temperature control unless your appliance is specified as a boiler only with an outdoor air reset option. If your appliance is a boiler only with an outdoor air reset option, there are additional controls for this option. They are explained under *Outdoor Air Reset Option*, page 7.

The three setting knobs on the temperature control are for Set point, Differential, and High-Fire Offset (see Figure 5).



**FIG. 5 Temperature Control**

### Maximum Set Point Determination

The maximum set point for the control is factory set. Boilers can be set to 240°F max., water heaters are set to 190°F max., and specialty state and local codes to 200°F.

These maximum set points are established by cutting the OJ1 and OJ2 jumpers located on the right side of the temperature controller. The maximum set point is determined as shown below in TABLE-B.

**TABLE B**  
**Maximum Set point Determination**

		Max. Set Point
OJ1	OJ2	
Connected	Connected	240°F
Cut	Connected	190°F
Connected	Cut	200°F
Cut	Cut	160°F

#### NOTE:

Anytime that OJ1 is the only jumper cut, a new overlay is required under the Set Point knob on the temperature controller because the scale has changed to a maximum of 190°F.

Anytime the OJ2 jumper is cut (with or without OJ1), a new overlay is required under the Set Point knob on the temperature controller because the scale has changed to a maximum of 200°F.

### Set Point

The Set Point knob specifies the target water temperature in degrees, Fahrenheit. After the water temperature reaches the set point, the temperature control shuts off the burners.

### Differential

The Differential specifies the number of degrees below the set point that the control will allow the water temperature to drop before it brings the appliance back on again.

### High-Fire Offset

The temperature control operates a two-stage firing system. The two stages are High-Fire and Low-Fire. High-Fire operates all burners while Low-Fire operates approximately one-half of the burners.

The High-Fire knob specifies the number of degrees below set point that the High-Fire stage shuts down. At that point, the appliance will continue to operate at the Low-Fire stage until the set point is reached.

The High-Fire offset knob has settings between 0°F and 20°F. If set at 0°F, the High-Fire offset is disabled and the appliance will operate at the High-Fire stage until the set point is reached and the temperature control shuts the appliance off.

No matter what the High-Fire offset knob is set to, the appliance will light at Low Fire and operate for approximately 10 to 120 seconds before the High-Fire stage actuates.

## OUTDOOR AIR RESET OPTION

### Outdoor Air Reset Option

For boilers ordered with the Outdoor Air Reset option, there is an additional control (FIG. 6). There are three setting knobs for Shutdown, Outdoor Air Max., and Ratio. There is also a switch to turn the outdoor air shutdown feature On or Off. An O.A. Sensor is also included.

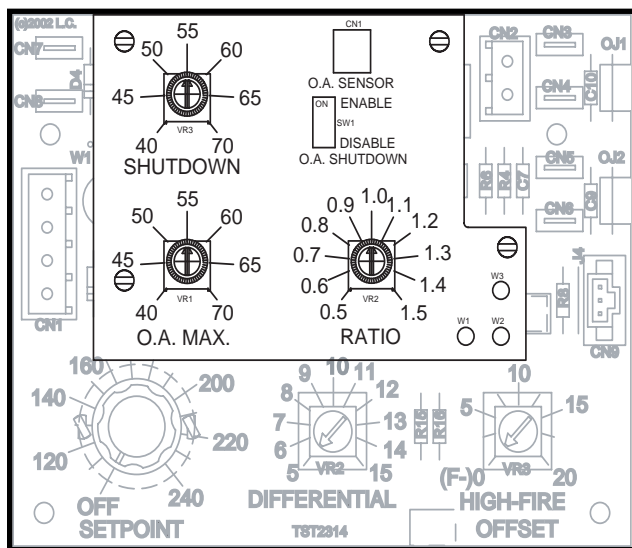


FIG. 6 Optional Outdoor Air Reset Control

### Shutdown

The Shutdown knob specifies the outdoor air lockout temperature at which the control would prevent the appliance from operating.

### Outdoor Air Max (O.A. Max)

The O.A. Max knob allows a reset up to the maximum outdoor air temperature specified by this knob setting. At any outdoor air temperature above the specified setting, the appliance will not reset but will continue to run at the set point temperature.

### Ratio

The Ratio knob allows control over the reset ratio to be used during Outdoor Air Reset. The allowable ratios are as low as 0.5:1 or as high as 1.5:1.

Selecting the 0.5:1 ratio will increase the set point 0.5°F for every 1.0°F drop in outdoor air temperature up to the maximum set point temperature.

Selecting the 1.5:1 ratio will increase the set point 1.5°F for every 1.0°F drop in outdoor air temperature up to the maximum set point temperature.

See Figure 7 for an outdoor air reset chart example.

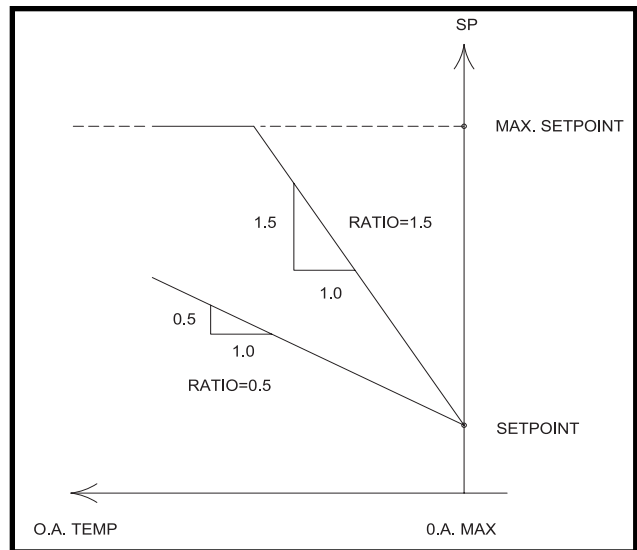


FIG. 7 Outdoor Air Control Example Chart

### Outdoor Air Shutdown Enable/Disable Switch

The Outdoor Air Shutdown Enable/Disable switch turns the outdoor air shutdown feature On and Off. Disabling the Outdoor Air Shutdown feature allows the appliance to operate regardless of the outdoor air temperature. This is needed for indirect domestic hot water systems for example.

